Module 4

Managing the Safety Basis

September 29, 2009 **8:00 – 3:00**

NUCLEAR EXECUTIVE
LEADERSHIP TRAINING

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Managing the Safety Envelope

Dr. Steven L. Krahn
Acting Deputy Assistant Secretary for Safety Management and Operations
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Dr. Krahn is currently and acting head of the Safety Management and Operations Office , an organization with a mssion to manage the Department of Energy/Environmental Management (EM) wide Integrated Safety Management System (ISMS) implementation oversight activities, DNFSB recommendations, and issues, operations safety and awareness programs, quality assurance programs, spent nuclear fuel & special nuclear material programs and various EM line management assessments.

Dr. Krahn has more than 30 years of technical and project management experience in positions of increasing responsibility in government, private industry and the military. His project management highlights include: management of the $140 million complex overhaul of a nuclear submarine; management of the $30 million nuclear work package for two submarines; producing the first-ever strategic plan for a federal agency; technical direction of the R&D program for two major DOE program offices; and the direction of the design and construction efforts for two major safety upgrades at DOE nuclear facilities.

In technical management, Dr. Krahn's highlights have included: providing technical direction and leadership for a federal agency providing safety oversight to the nuclear weapons complex; directing a $25 million division in an engineering services company; leading the technical review of numerous technical issues at nuclear facilities; and providing senior technical consulting services to the U. S. nuclear industry.

He has worked in a range of technical disciplines. These have included: materials science and metallurgy; nuclear engineering; planning and scheduling of major nuclear projects; nuclear and conventional power plant maintenance engineering; nuclear facility design and construction; and safety analysis.

Dr. Krahn has a Doctorate, Public Administration, University of Southern California, a M.S., Materials Science, University of Virginia, and a B.S., Metallurgical Engineering, University of Wisconsin, 1978. He also has a Graduate Certificate, Nuclear Engineering, Bettis Reactor Engineering School, U.S. Department of Energy, 1980.

He received the Meritorious Service Medal, U. S. Navy (upon retirement from the Reserves, 2000), Meritorious Service Award, U. S. Defense Nuclear Facilities Safety Board (DNFSB, 1998), John W. Crawford Award for Technical Excellence, U. S. DNFSB (1996, Inaugural Awardee) and was selected to the U. S. Senior Executive Service (SES, 1993).

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Mike Thomas

Senior Operations Advisor, DOE-SR

Mr. Thomas is presently assigned to the DOE-SR Office of Safety and Quality Assurance as the Senior Operations Advisor and is matrixed to the Manager, Savannah River Site as an advisor for nuclear safety. Previously, he served at the Office of River Protection as the team lead for operations, commissioning and testing. His duties included oversight of construction activities at the Waste Treatment Plan (WTP) and planning for WTP start-up testing and commissioning. He has also served as the Senior Facility Representative for the Spent Fuel and K Area Material Storage facilities at the Savannah River Site. He was the Senior Facility Representative at the Defense Waste Processing Facility during construction, commissioning, start-up testing, and initial start-up and operations. During this assignment, he was selected as the DOE Facility Representative of the Year.

Mr. Thomas served as the ORR team leader for the Glass Waste Storage Building #2, the K Area Interim Surveillance Facility, and the Interim Salt Disposition Project. He recently served as the Senior Advisor for an ORR at the Brookhaven National Laboratory High Flux Beam Reactor. He participated in the ORR for the West Valley Demonstration Project start-up as the Operations Subject Matter Expert. He was a team member of the Integrated Safety Management System Phase I & II Verification of the River Protection Project Waste Treatment Plant as the Management Systems Evaluator. He was a team member of the Integrated Safety Management System Phase II Verification of the Salt Waste Processing Facility. He has served on a Type A Accident Investigation Board for a fatality at the Savannah River Site and on a Type B Accident Investigation Board at the Savannah River Site for a water hammer event at H Canyon and for a worker injury event at the Savannah River National Laboratory.

Mr. Thomas served twenty years in the Naval Nuclear Propulsion Program. He served onboard several submarines in a variety of assignments including Reactor Operator, Engineering Watch Supervisor, Main Propulsion Assistant, and Engineering Officer for a refueling overhaul. Additionally, he served as the Staff Training Officer at the S7G Naval Nuclear Propulsion Training Unit. Mr. Thomas has a Bachelor of Science degree in Electrical Engineering from the University of Missouri.

Managing the Safety Basis

Dr. Steve Krahn

Mike Thomas

September 29, 2009

Learning Objectives

A. Explain DOE's approach to nuclear safety management through the use of 10 CFR 830.

B. Discuss the Nuclear Executive's roles and responsibilities for complying with, maintaining, and revising the Authorization Bases.

C. Explain the importance of configuration management to maintaining the Safety Basis and relate the USQ System to the proper implementation of configuration management.

Learning Objectives (cont.)

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D. Identify and explain the key issues in successful implementation of an OSHA Worker Protection Program.

E. Discuss the preparations for conducting a successful Operational Readiness Review and identify key indicators that a facility is not ready for one.

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Overview of Nuclear Safety Management Regulations and Requirements for DOE Nuclear Facilities and Operations

Dr. Steve Krahn

10 CFR 830 Overview Discussion of Subpart B: Background

Nuclear Executive Leadership Training

- PAAA amended AEA in 1988 to establish regulatory penalties
- Decision by DOE to enforce compliance with DOE nuclear safety requirements through the Code of Federal Regulations FR/Vol. 65, No. 196/10-10-2000
  - Codified DOE Directives related to nuclear safety
  - 3 CFRs established to allow DOE to impose civil and criminal penalties for non-compliance with nuclear safety requirements
    - 10 CFR Part 820, *Procedural Regulations for DOE Activities*
    - 10 CFR 830, *Nuclear Safety Management*
    - 10 CFR 835, *Occupational Radiation Protection*

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

Nuclear Executive Leadership Training

- 10 CFR 820 provides for the enforcement of violations of DOE Nuclear Safety Requirements
  - Established 1993
- Establishes the enforcement policy and framework for DOE to enforce compliance
- Civil and criminal penalties can be imposed on contractors under the PAAA
  - Applies to violations of nuclear safety requirements by:
    - Contractors
    - Subcontractors
    - Suppliers
  - Can apply to work conducted outside of a nuclear facility

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- 10 CFR 830 established DOE Nuclear Safety Regulations to:
  - Establish quality assurance requirements for contractors conducting activities, including providing items or services that affect, or may affect, nuclear safety of DOE nuclear facilities (Subpart A) (1994)
  - Establish safety basis requirements for hazard category 1, 2, and 3 DOE nuclear facilities (Subpart B) (Effective 2001, to be fully implemented in 2003)

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Key summary points:
  - QA requirements apply to **all** DOE nuclear facilities or activities that affect nuclear safety
  - Safety basis requirements apply only to Hazard Category 1, 2, and 3 DOE nuclear facilities
  - Focus of Safety Basis of Subpart B is on:
    - Documented Safety Analysis
    - Technical Safety Requirements
    - Unreviewed Safety Question Process

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

Nuclear Executive Leadership Training

Safety Basis Requirements:

- Define the scope of work
- Identify and analyze the hazards
- Require Categorization per STD 1027 – preliminary per inventory – final per STD 1027 and airborne release fraction (ARF) considerations
- Require the establishment of hazard controls

Feedback and Improvement provided through:

- USQ Process
- Annual Updates

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

Nuclear Executive Leadership Training

Requirements for the Documented Safety Analysis
10 CFR 830.204(b)

The DSA must address six items:

1. Describe the facility
2. Identify natural and manmade hazards
3. Evaluate normal, abnormal and accident conditions (consider beyond the design basis accident analyses)
4. Derive the hazard controls
5. Define the characteristics of safety management programs (QA, maintenance, radiation protection, fire protection, conduct of ops, etc.)
6. Define the criticality safety program: Ensures that operations with fissionable material remain subcritical, identifies criticality safety standards, describes how program meets safety standards

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

STD 1027 Categorization

(Implemented through unmitigated inventory thresholds)

A DOE nuclear facility categorized as:	*Has the potential for:*
Hazard category 1	Significant off-site consequences
Hazard category 2	Significant on-site consequences beyond localized consequences
Hazard category 3	Only local significant consequences
Below category 3	Only consequences less than those that provide a basis for categorization as a hazard category 1, 2, or 3 nuclear

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Safety Basis Documentation
  - DSA
  - TSRs (Hazard Controls including Safety Management Programs)
  - Any DOE-imposed conditions for operations described in the Safety Evaluation Report (SER)
- The contractor:
  - Must keep the safety basis current (DSA and TSR changes rolled up into annual update)
  - Must incorporate any changes, conditions, or hazard controls directed by DOE

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

Nuclear Executive Leadership Training

Compliance with "Safe Harbors"

- Methods that DOE has already determined to be acceptable for use.
- Standards or methods developed by DOE and NRC or defined in regulations promulgated by the Occupational, Safety and Health Administration (OSHA).
- The safe harbor methods are based on many years of experience with the types of facilities to which they may be applied.
- Contractors who use safe harbor methods in accordance with the provisions in Table 1 of Appendix A to Subpart B of Part 830-General Statement of Safety Basis Policy, do not need to obtain DOE approval prior to preparing a documented safety analysis."

Preamble to the Interim Final Rule (Oct. 10, 2000)

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)

Nuclear Executive Leadership Training

Compliance with "Safe Harbors"

- Should result in a contractor satisfying the regulatory requirements for a documented safety analysis.
- Contractor is responsible for meeting the requirements of the rule, even if it uses a safe harbor standard to prepare its documented safety analysis."

Preamble to the Final Rule (Jan. 10, 2001)

NOTE: Not all safe harbors satisfy all of the Rule's DSA requirements

Safe Harbor Applications

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

1. A DOE reactor . . . . . .
2. A DOE nonreactor nuclear facility . . . . . .
3. A DOE nuclear facility with a limited operational life. . . .
4. The deactivation or the transition surveillance and maintenance of a DOE nuclear facility.
5. The decommissioning of a DOE nuclear facility . . . .
6. A DOE environment restoration activity that involves either work not done within a permanent structure or the decommissioning of a facility with only low-level residual fixed radioactivity.

Safe Harbor Applications (Continued)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

7. A DOE Nuclear explosives facility and the nuclear explosive operations conducted therein.
8. A DOE hazard category 3 nonreactor nuclear facility
9. Transportation activities
10. Transportation and onsite transfer of nuclear explosives, nuclear components, Naval nuclear fuel elements. Category I and Category II special nuclear material, special assemblies

Safety Design Basis Documents

- Safety Design Strategy (SDS) - roadmap for how important safety issues will be addressed in design and in tailoring the development of key safety documentation.
- Conceptual Safety Design Report (CSDR) - summarizes the hazards analysis efforts and safety-in-design decisions in the conceptual design, and any identified project risks associated with the selected strategies.
- Preliminary Safety Design Report (PSDR) updates the information in the CSDR, adding design detail.
- Preliminary Documented Safety Analysis (PDSA) demonstrates the adequacy of the design from the safety prospective to support construction of the facility.
- The DSA evolves from the PDSA and reflects the as-built design.
- The Technical Safety Requirements (TSRs) are developed, based upon the DSA.

Approval of Nuclear Facility Safety Documentation

- DOE-STD-1104, *Review And Approval Of Nuclear Facility Safety Basis And Safety Design Basis Documents*
  - Addresses the review and approval of all the safety basis documents developed per DOE-STD-1189-2008.
  - Prepared to be consistent with 10 CFR Part 830 and its Implementation Guides
  - Should be used in conjunction with the Rule and its implementing guidance for safety basis documents
  - Consistent with DOE O 413.3A, Change 1, and DOE-STD-1189-2008 and used in conjunction with those documents, the Rule, and their implementing guidance for safety design basis documents.
  - Provides specific guidance on approval of safety documentation including preparation of the Safety Evaluation Report (SER)

New hazard category 1, 2, and 3 nuclear facilities (designed under DOE-STD-1189)

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- Safety documentation during the design process (up to final design)
  - Safety Design Strategy adequate?
  - Commitment to DOE safety design criteria of DOE O 420.1B?
  - Compliance with DOE-STD-1189 safety design process?
  - Have unresolved safety issues been identified and are they being dealt with via the risk management plan?
  - Is safety in design progress adequate to support proceeding into the next stage of design?

New hazard category 1, 2, and 3 nuclear facilities (designed under DOE-STD-1189) (continued)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Preliminary Documented Safety Analysis (at end of final design)
  - If DOE safety design requirements have been satisfied through the processes described in DOE O 413.3A and associated guidance, the requirements and processes of DOE-STD-1189, and the safety design criteria and guidance of DOE O 420,1B, the contractor and DOE should have confidence that the resulting design will provide for adequate protection of the public, workers, and the environment.

Approval Bases for Safety Basis for New Facilities

- A facility designed under DOE-STD-1189 and associated requirements should not require a de nova review.
- The safety in design process should result in a facility that provides for adequate protection of the public, workers, and environment
  - Focus on any changes and/or new information from approved PDSA
  - Consistency of completed facility with approved final design
  - Complete and correct (compliance with TSR Implementation Guide) derivation of TSRs from hazards analysis and hazard control selection and classification in DSA

Approval Bases for Safety Bases of Existing Nuclear Facilities

Mostly dealing with facilities designed many years ago under different requirements and practices, so the issue is different than for new facilities:

- Compliance with 10 CFR 830 DSA safe harbor?
- Consistent with DSA requirements of 10 CFR 830?
- Case-by-case evaluation of adequate safety for public, workers, environment
  - Hazards analyses, hazard controls and classification, unmitigated and mitigated accident consequences and probability estimates
  - Consideration of adequacy of existing design and controls and the need for compensatory measures and/or upgrades
- Complete and correct (compliance with TSR Implementation Guide) derivation of TSRs from hazards analysis and hazard control selection and classification in DSA

Approval Bases for Major Modifications of Existing Facilities

- Is modification correctly classified (major mod or not)?
  - Note that this should occur at the beginning of a proposed modification.
  - DOE-STD-1189 has criteria for a major mod decision.
  - If a major mod, prepare a Safety Design Strategy

Approval Bases for Major Modifications of Existing Facilities (Continued)

- PDSA approval
  - Adequacy of hazards analyses and selection and classification of hazard controls
  - Compliance with safety design requirements of DOE O 420.1B
  - Compliance with safety classification requirements and guidance of DOE-STD-1189 Appendices A, B, C, and D
    - Cost/benefit considerations regarding existing facility design (e.g., seismic design categorization
- DSA approval considerations
  - Consistency between PDSA and final design
  - Facility DSA and TSR integration

Safety Evaluation Report (SER)

- Developed specifically to document acceptance of:
  - PDSA
  - DSA
  - TSRs

Review and Approval of the SER — Safety Basis Approval Authority Responsibilities

- Ensures the timely and proper:
  - Review of all safety basis documents submitted to DOE and
  - Preparation of a SER concerning the safety basis for a facility.
  - Review and approval process represents all DOE entities with vested interest in the facility under review and considers commitments made to agencies outside DOE.
- Assigns a review team leader the responsibility of performing an independent review.
  - Responsibility as the single point of contact between DOE and the facility contractor for all matters regarding review of the PDSA, DSA and TSRs (may be assigned to Team Leader).

Review and Approval of the SER — Approval Authority Responsibilities (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Ensures the review and approval process represents all DOE entities with vested interest in the facility under review and considers commitments made to agencies outside DOE.
- Determines the final disposition of significant issues.
- Tracks and resolves conditions of approval.

Discussion of Key Issues for Safety Basis Documentation and Implementation

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- **Documentation**
  - **DSA Quality** (Is it clear and complete and are the hazards and accidents thoroughly analyzed?)
  - **TSR Derivation Adequacy** (Are the controls adequate and links to DSA clearly identified?)
  - **Safety Management Program Documentation in the DSA and TSRs** (Are SMP key elements credited in the DSA adequately described in DSA and properly linked to TSRs so that the safety basis can be maintained?)
  - **Resolution of SER Significant Issues** (Are final dispositions of significant issues complete and documented?)

Discussion of Key Issues for Safety Basis Documentation and Implementation (cont.)

- **Implementation**
  - **TSRs Implemented**
  - **Flow-down of safety basis requirements to facility procedures** (Are implementing procedures clearly linked to the safety basis?)
  - **Staff Training and Qualification** (Are operations personnel adequately trained and qualified? Is there a system engineer program in place?)
  - **Other Key Implementation Issues?**

Complying With, Maintaining, and Revising the Authorization Bases

Dr. Steve Krahn

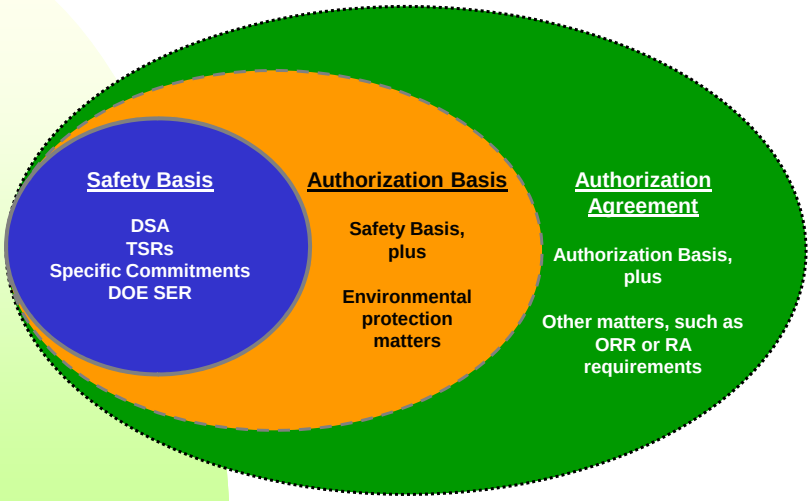
Concept of the Authorization Basis

- DOE owned and contractor (or Gov't) operated hazardous nuclear facilities. DOE is ultimately responsible for the safety of its facilities.
- Broad conditions for authorizing operations
  - Regulations: DEAR clause for ISM, 10 CFR 830, 835, 851
  - Contract: ISM/DOE Orders, Standards, others, and flow down
- Facility-specific conditions for operations
  - Authorization Basis: AB Agreements – Cat 1 and Cat 2 nuclear facilities (safety and environment)
  - Safety Basis: DSA and TSR for Cat 1, 2, and 3 nuclear facilities (a subset of the coverage of the AB)

Authorization Basis and the Safety Basis

An **Authorization Basis** encompasses all the conditions for operations of a DOE facility, and includes both the Safety Basis and environmental requirements, such as compliance with EPA regulations and state agreements, etc.

Components of the Authorization Agreement



Federal and Contractor Staffing Issues

- The Federal staff available to prepare an SER is often limited and on-site resources may not have the expertise/experience needed to be successful
- The contractor expertise needed to prepare authorization basis documentation and implementing documents is unique and not always readily available
- Additional contractor and/or Federal resources may be required — both part-time and permanent
- Approval Authority (i.e., us—the Feds) needs to maintain control of the process and "own" the results

Using Outside Resources to Support AB Issues

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- Critical decisions may require expertise beyond “in-house” capability
- Outside resources in EM, NA and HS, along with CTAs, are available on a part-time basis to support AB issues
- Lessons learned?

Group Discussion - Key Issues for Implementing, Maintaining and Revising the Authorization Basis

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- Safety Basis issues plus incorporation of environmental requirements into facility procedures
- Authorization Basis integration with the site’s ISM system
- Linking all requirements to implementing procedures
- Protection of assumptions in the DSA
- The USQ process
- Configuration management

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Unreviewed Safety Questions

Dr. Steve Krahn

What Constitutes a USQ?

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A situation where:

1. The probability of the occurrence or the consequences of an accident or the malfunction of equipment important to safety previously evaluated in the documented safety analysis could be increased;
2. The possibility of an accident or malfunction of a different type than any evaluated previously in the documented safety analysis could be created;
3. A margin of safety could be reduced; or
4. The documented safety analysis may not be bounding or may be otherwise inadequate.

Purpose of the USQ Process and Relationship to the Safety Basis

Nuclear Executive Leadership Training

- To authorize contractors at nuclear facilities to grant final approval to changes without DOE approval, provided that the changes can be accommodated within the existing safety basis
- Intended to provide the flexibility needed for day-to-day operations
  - Not for major modifications/upgrade projects
  - Not for technologies that are new to the facility – could introduce new failure mechanisms

Purpose of the USQ Process and Relationship to the Safety Basis (cont.)

Nuclear Executive Leadership Training

- Contractor may grant final approval to changes that do not involve a USQ
- To protect the integrity of the safety basis on a continuing basis
  - To determine which changes must be submitted to DOE for review and approval (positive USQDs)

USQ – Expectations and Requirements

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Requirements of the Rule (10 CFR 830.203)

- Must implement DOE-approved USQ procedure [that is, prepare a USQD] in situations where there is:
  - Temporary or permanent change in the facility as described in the existing documented safety analysis (DSA)
  - Temporary or permanent change in procedures as described in the existing DSA
  - Test or experiment NOT described in the existing DSA
  - Potential inadequacy of the DSA because the analysis may not be bounding or may be otherwise inadequate (PISA)
- Must obtain DOE approval prior to taking any action determined to involve a USQ

USQ – Expectations and Requirements (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Requirements of the Rule (10 CFR 830.203)

- Must submit to DOE an annual summary of the USQDs performed. This is a great opportunity for dialogue on the health of the safety basis
- If a Potentially Inadequate Safety Analysis (PISA) is discovered, the Rule requires the contractor to:
  - Take action [initiate operational restrictions], as appropriate, to place or maintain the facility in a safe condition until an "evaluation of the safety of the situation" is completed
  - Notify DOE of the situation
  - Perform a USQD and notify DOE promptly of the results
  - Submit the "evaluation of the safety of the situation" to DOE prior to removing any operational restrictions initiated to meet this regulation

USQ – Expectations and Requirements (cont.)

- Candidate items for USQ screening
  - Changes to a requirement in the TSRs, or the addition of a new TSR requirement;
  - Changes that management has already decided will be submitted to DOE for safety review and approval (e.g. major modifications);
  - The installation of an item that is an exact replacement (that is, same manufacturer, same model number, etc.); the installation of an item that is on the facility "Approved Equivalent Parts" list, for which a facility engineer has evaluated and concluded that the replacement item meets all the requirements pertinent to the specific application at the facility, including the service conditions;

USQ – Expectations and Requirements (cont.)

- Candidate items for USQ screening (cont.)
  - Changes for which common commercial practices would suffice, and a formal nuclear-grade change control process is not warranted (for example, changing fixtures for fluorescent lighting in a control room of the facility); and
  - Changes to documents that are purely editorial and make no technical change.

DOE G 424.1-1

USQ – Expectations and Requirements (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Categorical Exclusions

- Must be DOE Approved
- Used or Misused

USQ – Expectations and Requirements (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Configuration Management and Its Relationship to the USQ Process

- Change control is the key to CM
- All other CM elements are secondary
- What is a change?
  - Not a change if “exact” replacement
  - A configuration change if an “Approved Equivalent” component, but not design change
  - Includes TEMPORARY AND PERMANENT hardware, software, and new operations (tests and experiments)

USQ – Expectations and Requirements (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Configuration Management and Its Relationship to the USQ Process

- USQ process is intended to be part of an overall Change Control process
  - USQ process focuses on “Changes”
  - No Change; No Change Control; No USQ
- If at a nuclear facility, USQ process must consider:
  - All changes: hardware, documents, new activities
  - All structures, systems, or components (SSCs), not just safety-class or safety-significant SSCs
  - Nuclear hazards and other hazardous materials
  - Potential consequences to public, co-located workers, and facility workers

USQ – Expectations and Requirements (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Configuration Management and Its Relationship to the USQ Process

- USQD is not a substitute for safety analysis. Contractor determines if the change is actually “safe” as part of change control, prior to entering the USQ process
- The quality of the safety basis is directly related to the USQ process
- USQ process is part of a healthy CM program
- A CM program will involve more than just safety-related changes…The Mission

USQs as Performance Indicators

- The USQ process is intended to support the routine maintenance and configuration management of the facility
  - USQDs are a routine part of that process
  - The number of USQDs reflects the maintenance to equipment or procedural changes performed in the facility – **not necessarily a negative indication**
- The number of positive USQDs (USQs) may indicate that the USQ process is being used as the "Safety Analysis" for changes to equipment or procedures – **a "negative" indicator**
- A USQ is NOT a bad thing

USQ Practical Exercise

Break into Groups

- This exercise will be completed in break-out groups
- Each group will select a spokesperson
- Instructions for the exercise are provided separately
- Each group has 30 minutes to complete the exercise
- Each group spokesperson will present their group's conclusions to the entire class

The Role of the Maintenance Organization in Safety Management

- Equipment maintenance is necessary to ensure continued operability of equipment important to safety
- Repair or replacement of equipment that is important to safety has the potential to degrade performance of the equipment which will impact the safety basis
- The maintenance organization must practice strict configuration control to maintain the safety basis

Considerations for Upgrade of Facility and Safety Systems

- Over time, the infrastructure supporting equipment important to safety should be evaluated.
  - Although the equipment functions as designed, what if the roof were to fall on the equipment?
- Lessons learned?

Group Discussion — Key Issues for Maintaining a Configuration Management Program

- Does the CM program at a facility incorporate the key elements of a successful CM program?
  - Program Management
  - SSC Requirements
  - Document Control
  - Change Control
  - Assessments of the CM Program

Worker Safety and Health Programs

Dr. Steve Krahn

Worker Protection Priorities

Nuclear Executive Leadership Training

Balancing worker protection priorities between safety basis and OSHA requirements

- Hazard Controls are clearly defined in the facility safety basis but not clearly defined in every worker activity.
- Examples of safety basis hazard controls for worker protection?
- Rad protection versus industrial safety?
- Examples of hazard controls for OSHA protection?
- Where does ISM fit?

ISM at the Worker Level

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Safety of non-routine work, or short-term tasks, is generally maintained through *work authorization system*

- Directed toward protection of workers, usually maintenance workers
- Job hazards analyses and job task analyses identify hazards and controls

DOE G 421.1-2, Section 5.4

Worker Safety and Health Programs

- Compliance with OSHA standards. (29 CFR 1960.16)
- "Each agency head shall comply with all occupational safety and health standards issued under section 6 of the Act, or with alternate standards issued pursuant to this subpart."
- 10 CFR 851 – final Rule 2/06
  - Worker Safety and Health Plans – 2/07
  - "Compliance" – 6/07

Worker Safety and Health Programs (cont.)

10 CFR 851, Overall Structure

- General Provisions
  - Worker Safety and Health Program
  - Procedures for Investigation and Enforcement
  - Definitions, etc/
- Program Requirements
  - General requirements
  - Development, approval and implementation

Worker Safety and Health Programs (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

10 CFR 851, Overall Structure (cont.)

- Hazard identification and assessment
- Hazard prevention and abatement
- Safety and health standards
- Functional areas
- Training
- Variances
- The Enforcement Process

Appendix A – Functional Areas

Appendix B – Enforcement Policy

10 CFR 851—Subjects Covered

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Functional Area Requirements
  - Construction Safety
  - Fire Protection (DOE 420.1, Facility Safety, applies)
  - Firearm Safety
  - Explosives Safety
  - Industrial Hygiene
  - Biological Safety
  - Pressure Safety
  - Motor Vehicle Safety
  - Electrical Safety

DOE O 440.1A, Worker Protection Management for DOE Federal and Contractor Employees

- Implementation Guides for DOE O 440.1A
  - DOE G 440.1-1, WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES GUIDE
  - DOE G 440.1-2, CONSTRUCTION SAFETY MANAGEMENT
  - DOE G 440.1-3, OCCUPATIONAL EXPOSURE ASSESSMENT
  - DOE G 440.1-4, CONTRACTOR OCCUPATIONAL MEDICAL PROGRAM
  - DOE G 440.1-5, FIRE SAFETY

Occupational Safety and Health Programs Within DOE

- Keys for Successful Implementation
  - DOE and Contractor Personnel are trained and qualified on OSHA requirements and DOE implementation requirements
  - Integrations with “other safety programs”??
- 10 CFR 851
  - Effective 02/09/2007
  - Compliance achieved on 5/27/07
  - Experience??

Group Discussion

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Work Control Process

- Who has work authorization authority (contractor) at your site/facility?
- What requirements are in place to ensure that job hazards are identified and appropriate controls implemented?
- What processes/procedures are in place to ensure that the worker understands the hazards and the controls?
- Some sites are using generic hazards analyses for routine tasks. Can this be effective?

Nuclear Executive Leadership Training

Operational Readiness Reviews

Mike Thomas

Outline

- Readiness Reviews
- Readiness Review Process
- Recent Trends & Success Factors
- Directives Review and the ORR Order

Operational Readiness Review

- A disciplined, systematic, documented, performance-based examination of:
  - Facilities, Personnel, and Procedures
  - Management Control Systems/Safety Management Programs
- Verifies that a facility is ready to start operating safely within its approved Authorization Basis as defined in the Authorization Agreement/Safety Basis
  - Evaluates implementation of approved authorization agreement
  - It does not re-evaluate the adequacy of the approved documents

Purpose of ORR or RA is twofold:

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1. Ensure readiness of facility and personnel to start the facility within the bounds of acceptable risk:
   - Within the safety basis/Authorization Agreement
   - In compliance with applicable ES&H regulations

2. Ensure the facility/activity has adequate Safety management programs implemented and sufficient controls in place to start and continue nuclear operations within those bounds.

When to have an ORR

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- For initial startups of new hazard categories 1, 2, & 3 nuclear facilities;
- For a restart after an unplanned shutdown by DOE management official for safety or other appropriate reason;
- For a restart after an extended shutdown of hazard category 1 & 2;
- After substantial modifications as determined by Startup Authorization Authority;
- For a restart after shutdown because of operations outside the safety basis; and
- When deemed appropriate by DOE management officials – including hazard category 3.

When to have a Readiness Assessment (RA)

- For restarts of nuclear facilities not requiring an ORR, DOE, and contractor line management shall evaluate the need for performing a RA prior to restart.
- When a RA is required, Operations Offices shall develop procedures and ensure that the contractors use these procedures to gain Operations Office approval of the startup or restart of nuclear facilities.
- If a RA is not to be performed, the contractor's standard **operating** procedures for startup or restart will be used.
- Contractor procedures should not be developed to avoid conduct of a properly scoped RA

Flexibility Options of RA

- "Broad as an ORR" -or- "Narrow as a checklist":
  - Utilize Appropriate Core Requirements;
  - Define and justify in POA.
- Authorization Authority – Contractor or DOE:
  - Discuss and justify in the SNR.
- Number and Timing of RA's:
  - Contractor only – DOE Monitor;
  - Contractor and DOE – in Parallel;
  - Contractor and DOE – in Series;
  - Proposal defined in SNR (STD 3006-2000).

Other Methods….

- None!
  - If a Review is needed, minimum RA requirements must be followed!
- If Startup Review is not needed...
  - Use Building/Process/Activity Standard Operational Procedures.
- Contractor procedures must not be developed for the purpose of not accomplishing a properly scoped RA when required.

ORR Startup Authorization Authority

Startup and Restart Authority	S-1	SO	DOE Official
Initial startups of new hazard categories 1 and 2 facilities	✓		
For initial startups of new category 3 facilities		✓	
Shutdowns directed by DOE for safety or other reasons			✓
Extended shutdowns of category 1 facilities		✓	
Extended shutdowns of category 2 facilities		✓	
Shutdowns because of substantial (as determined by Authorization Authority) modifications of hazard category 1 and 2 nuclear facilities		✓	
Shutdowns due to operations outside the safety basis		✓	✓
Startups or restarts for which ORR were required		✓	✓

Role and Responsibilities

Readiness Activity	Line	ORR Team
Develop and implement a plan to achieve readiness	✓	
Define need for review or exception – submit SNR	✓	
Develop and ORR/RA Plan of Action	✓	
Develop an Implementation Plan		✓
Achieve Readiness/Management Self-Assessment	✓	
Readiness to Proceed Memo	✓	
Conduct the review, develop ORR Report		✓
Corrective Action Plan and resolution of findings	✓	
Startup Authority authorizes start of operations	✓	

Startup Notification Report (SNR)

- A periodic report by each responsible contractor to identify future nuclear facility restarts and new starts that:
  - specifies a recommendation for an ORR or RA or routine startup, and
  - proposes the Startup Authorization Authority(SAA);
  - describes the facility; and
  - Discusses background of start up in sufficient detail…
- Detailed Procedures in Contractor and local DOE/NNSA Directives.

Plan of Action (POA)

- Presents "Geographic Scope" of Review:
  - Which facilities are involved?
  - Which systems (process & support) are involved?
  - What Safety Management Programs are involved
  - Which Personnel groups? Support groups?

- Presents "Content Scope" of Review:
  - Excluded Core Requirements:
  - Subjects that are not applicable…
  - Safety Management Programs interface discussion…
  - Core Requirement Depth Discussion…

Plan of Action (cont)

- Specifies Prerequisites for start of Readiness Review
  - Specific to each Core Requirement
  - Comprehensive and Measurable
- Includes Proposed Team Leader
- Prepared by Contractor and DOE line management
  - A separate POA for the contractor and DOE Readiness Review
- Approved by SAA (both contractor and DOE POAs)
- Basis for the Team's Implementation Plan

Readiness to Proceed Memorandum

- Line Management commitment to their readiness to begin operations:
  - Appropriate to Contractor and Departmental reviews…
- Site Office endorsement (Departmental review only):
  - Basis for judgment of Contractor readiness…
  - Department specific requirements and actions…
- Short list of Open Items – "Manageable List":
  - Defined path to closure…

Post ORR Activities

- Line management responsible for resolution of results…
- Thoughtfully evaluate the entire ORR Report:
  - Review forms in detail;
  - Issues or observations identified in the forms require management attention, even if not identified as findings;
  - Some opportunities for improvement may not be listed as findings; and
  - Analyze the summary, conclusions, and lessons learned.
- Debrief counterparts – they should have details beyond the report.
- Execution of the "Startup Plan"

Contractor ORR/RA Corrective Action Plans (CAP)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- Completion of Contractor Corrective Action Plan less a "manageable list of open prestart items" is a prerequisite to the DOE/NNSA ORR/RA.
- Closure of Contractor ORR/RA items:
  - Ensure the plan is implemented;
  - Verify adequate closure process;
  - Ensure Evidence for Closure.
- Items scheduled for closure past commencement of operations:
  - Is the delay of closure appropriate/safe?
  - Appropriate compensatory measures specified and implemented
  - ORR/RA Standard contains sample closure forms.

ORR/RA Closure

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- ORR/RA report may recommend who in line management should verify closure of findings.
- Closure verification and approval to start operations is line management's responsibility.
- Corrective Action Plans and Closure Packages Required, including Findings Against DOE/NNSA.
- CAP approval by DOE/NNSA required:
  - corrective action plans…

Exemptions

- Appropriate in unique situations:
  - Short duration D&D; National priority activities,
- Compensatory measures required:
  - Ensure safety;
  - Defined requirements/completion/transition.
- Requires CTA concurrence
- Discussed in STD 3006-2000, Sections 4.6 & 5.11.
- CSO and HSS Must Review;
- 30-Day clock without objection;

Recent Trends – Facility Issues

- **Facility/Program Weaknesses**
  - TSR identification and compliance
  - USQ process implementation
  - Configuration management
  - Inadequate training programs
  - Radcon
  - Industrial safety
  - Startup programs
- **Procedural Weaknesses**
  - Integrated execution
  - Activity hazards analyses (AHAs)/operating procedures
  - Misclassification of skill-based work
- **Personnel**
  - Inadequate training

Recent Trends – Conduct of Review Issues

- Evolution planning between the facility and ORR team not supporting demonstration of comprehensive start-to-finish operations
- Frequent review delays and limited access to facility documentation and training limit the team's ability to adequately prepare for the review
- Staffing ORR teams from within the same field and/or line element challenge the notion of independence and limit the opportunity for knowledge transfer between programs & sites
- Managers provide inadequate support to permit team members to meet team expectations. Day jobs interfere with ability to concentrate on team responsibilities

Ongoing Program Challenges

- Lack of consistency across the Complex in quality of documentation including Startup Notification Reports, Plans of Action, and Implementation Plans
- SNRs and POAs are not submitted in a timely manner to permit appropriate decisions
- Less rigorous Readiness Reviews (RA vs. ORR) rationalized particularly for restarts of existing facilities
- Inappropriate exclusion of areas to be reviewed
- Inappropriate decisions to accomplish no independent readiness reviews. Line reviews specified when DOE O 425.1C review required.

Causes of Readiness Problems

- Inadequate project planning to achieve readiness
- Ineffective Management Self Assessment Process
- Starting Readiness Reviews prior to achieving readiness - equipment not ready, procedures don't work, operators not trained
- Criteria and process for DOE field verification of contractor and oversight readiness lacking
- Corrective Action Plan development and finding closeout process lacking

Keys to Successfully Achieving Readiness

- Comprehensive project plan prepared when the project identified—DOE should participate
- Safety Basis Documentation—Early approval; timely implementation; comprehensive IVR
- Safety Management Programs—Robust and comprehensive to support facility
- Comprehensive operational practice
- Comprehensive and timely MSA
- DOE field oversight and Self-assessment

Keys to a Successful ORR/RA

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Management
Execute plan to achieve readiness
Comprehensive Line Management Self Assessment (LMSA) is performed
ORR is scheduled and management appropriately declares readiness
Procedures are implemented prior to ORR
DOE Corrective Action Process (CAP) is understood and communicated

Plan of Action (POA)
Early Preparation and submittal to support timely review and approval
Details the scope and breadth of the ORR
Core Requirements are appropriately scoped for the startup
Prerequisites are tied to Core Requirements
Designate Team Leader with appropriate knowledge, experience and independence

Keys to a Successful ORR/RA (cont.)

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

Team Leader
Senior experienced employee identified to lead the ORR Team
Independent, assigned early and dedicated to the ORR
Engineering/operations background & previous ORR Team Leader a plus
Prior experience as an ORR Team Member is a must
Report preparation skills and ability to evaluate & present detail information

Team Members
Independent and excused from their normal job duties
Briefed on revised process/procedures due to any delay of ORR start or contractor rework
Technical competence in assigned functional areas and assessment techniques
Time to adequately prepare and involved in the initial site visits
Good written and oral communication skills are a must

ORR/RA Success Factors

- Access to and involvement of the Site Office Manager is critical.
- FAC REP support in providing information and monitoring ORR progress
- Federal staff are provided to qualify as team members and to conduct ORRs
- Active involvement by management in the prompt resolution of issues

Proposed Changes to Readiness Review Order

- Update initiated during DOE Safety Directives Review
- With continual maturity in readiness prep and verification; require fewer ORRs
- Increase emphasis on RAs
- Increase clarification of expectations for RAs
- Clarify expectations for RA whenever routine procedures are not adequate
- Update Standard to reflect changes

Remember…..an ORR Should be:

NUCLEAR EXECUTIVE LEADERSHIP TRAINING

- A disciplined, systematic, documented, examination of facilities and equipment, personnel, procedures, and management control systems to ensure that a facility will be operated safely within its approved safety basis.

- The readiness reviews are not intended to be tools of line management to achieve readiness. Rather, the readiness reviews provide an independent confirmation of readiness to start or restart operations.